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what is claimed is :
~~CLAIMS~~

1. A process for upgrading a titaniferous material by removal of impurities which process includes the steps of:-

5 (i) heating a titaniferous material to a temperature of less than 1300°C to produce a solid titaniferous phase and a liquid oxide or glassy phase in the presence of sufficient of compounds which encourage the formation of the liquid oxide or glassy phase;

10 (ii) cooling the product of step (i) to form a solidified material comprising the titaniferous phase and an impurity bearing phase at a rate sufficient to ensure the susceptibility of the impurity bearing phase to leaching in either an acid or alkaline leachant; and

15 (iii) leaching the solidified material with an acidic or alkaline leachant to leach at least a portion of the impurities.

2. A process for upgrading a titaniferous material according to Claim 1 wherein the compounds which encourage the formation of the liquid oxide or glassy phase at a temperature below 1300°C are compounds of sodium, potassium, lithium, phosphorus, silicon or boron.

3. A process ~~for upgrading a titaniferous mineral~~ according to Claim ¹⁸ 2, wherein the ~~compound of sodium is~~ ^{additive comprises} caustic soda.

4. A process ~~for upgrading a titaniferous mineral~~ according to Claim ¹⁸ 2, wherein the ~~compound of sodium is~~ ^{additive comprises} sodium carbonate.

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5. A process ~~for upgrading a titaniferous mineral~~ according to Claim ¹⁸2, wherein the ~~compounds~~ ^{additive comprises} include borax.

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5 6. A process ~~for upgrading a titaniferous mineral~~ according to Claim ¹⁸2, wherein the ~~compounds~~ ^{additive comprises} comprise a mixture of soda ash and borax.

Sub B5
10 7. A process according to Claim 6, wherein the titaniferous material is heated to a maximum temperature of 1000°C for a period which avoids substantial reduction to metal of contained iron oxides.

15 8. A process according to Claim 7, wherein the solidified material is leached with water.

20 9. A process according to Claim 7, wherein the solidified material is leached with a recycled solution of leach liquor containing sodium silicate and borax to form a leachate and a residue.

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25 10. A process according to Claim 9, wherein the leachate is separated from the residue and the residue is leached with ^{1-20 wt. %} hydrochloric acid ~~having an acid strength in a range from 1- to 20% hydrochloric acid.~~

Sub B4
30 11. A process according to claim 1 wherein the compounds include compounds which extend the effect of other compounds.

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12. A process according to claim 11, wherein a compound which extends the effect of other compounds is borax.

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13. A process according to claim ¹⁷1 wherein sufficient ^{additive 15} ~~compounds are~~ present to avoid the formation of titanate

phases that are not amenable to subsequent leaching.

B 14. A process according to claim 1¹⁷ wherein the solidified material is leached under mild conditions.

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B 15. A process according to claim 14, wherein the solidified material is leached at atmospheric pressure.

16. An upgraded titaniferous material produced by the
10 process of ~~any one of claims 1 to 13.~~

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B.1

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